

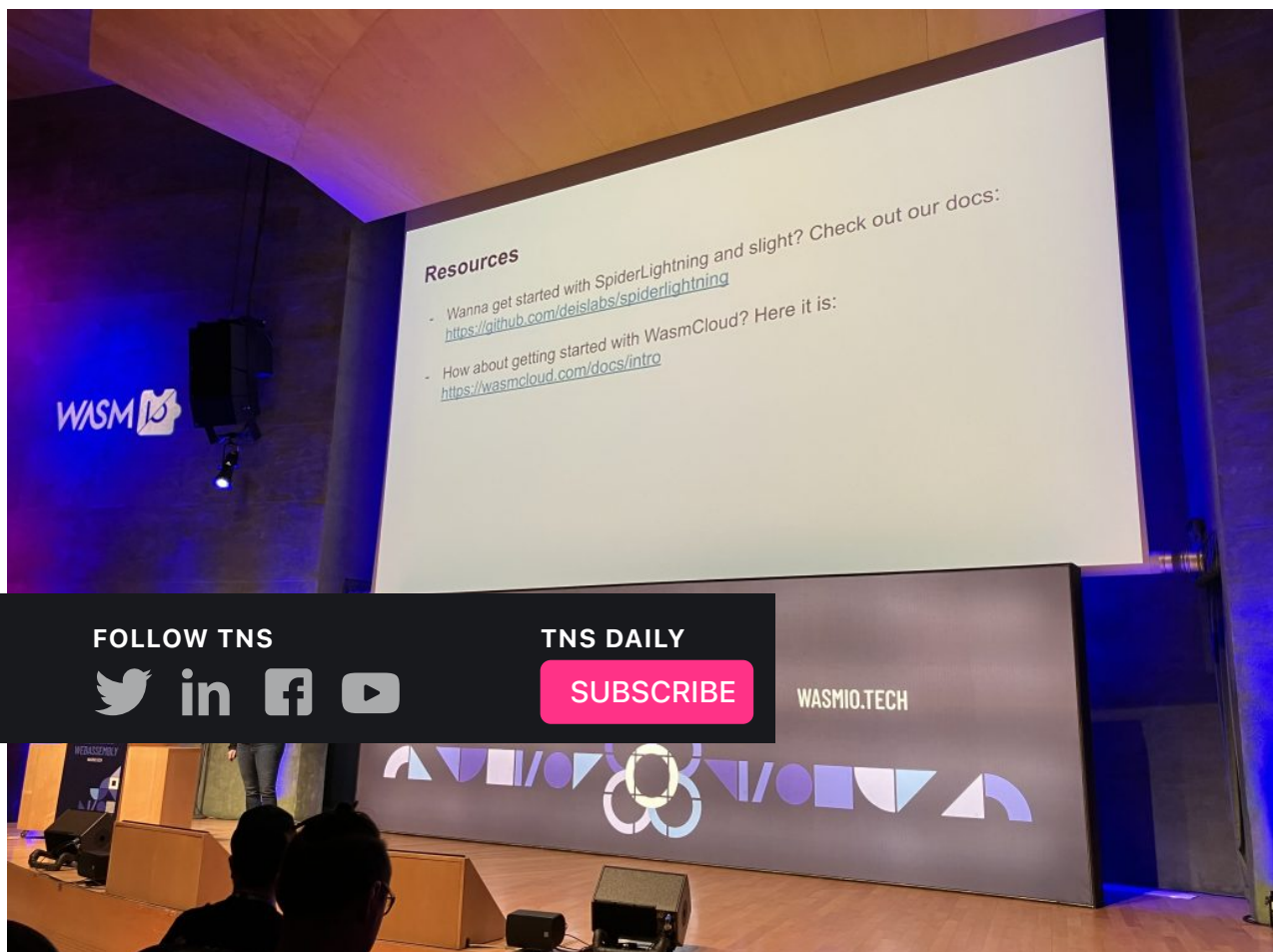


EDGE COMPUTING / WEBASSEMBLY

# What Wasm Needs to Reach the Edge

At the WASM I/O conference held in Barcelona, many discussed WebAssembly reaching the edge. Before that can happen, standards will need to be set.

Mar 27th, 2023 9:00am by [B. Cameron Gain](#)



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When developing remotely, do you use a cloud development environment (CDE)?

Yes, I use a CDE when developing remotely.

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Write once, run anywhere. This mantra continues to hold true for the promise of **WebAssembly** (WASM) — but the keyword is “promise” since we are not there yet, especially for edge applications, or at least not completely. Of course, strides have been made as far as WebAssembly’s ability to accommodate different languages beyond JavaScript and Rust as vendors begin to support different languages, such as TypeScript, Python or C#.

As of today, WASM is very much present in the browser. It is also rapidly being used for backend server applications. And yet, much work needs to be done as far as getting to the stage where applications can reach the edge. The developer probably does not care that much — they just want their applications to run well and security wherever they are accessed, without wondering so much about why edge is not ready yet but when it will be.

Indeed, the developer might want to design one app deployed through a WebAssembly module that will be distributed across a wide variety of edge devices. Unlike years past when designing an application for a particular device could require a significant amount of time to reinvent the wheel for each device type, one of the beautiful things about WASM — once standardization is in place — is for the developer to create a voice-transcription application that can run not only on a smartphone or PC but in a minuscule edge device that can be hidden in a secret agent's clothing during a mission. In other words, the application is deployed anywhere and everywhere across different edge environments simultaneously and seamlessly.

During the **WASM I/O conference** held in Barcelona, a few of the talks discussed successes for reaching the edge and other things that need to be accomplished before that will happen, namely, having standardized components in place for edge devices.

## **The Missing Link**



**BC Gain**

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What is an edge component? Microsoft's Francisco Cabrera gave his description as he began his talk on AKS Edge Essentials and Akri on WASMs (and other tools). [@wasm\\_io](#) [#wasm](#) [#wasmio23](#) [@thenewstack](#) [revecom.io](#)



Edge is **one of those buzzwords** that can be misused or even misunderstood. For telcos, it might mean servers or different phone devices. Industrial devices might include IoT devices, applicable to any industry or consumer use for users that require connected devices with CPUs.

An organization might want to deploy WASM modules through a Kubernetes cluster to deploy and manage applications on edge devices. Such a WASM use case was the subject of the conference talk and demo "Connecting to devices at the edge with minimal footprint using AKS Edge Essentials and Akri on

WASMs" given by **Francisco Cabrera Lieutier**, technical program manager for Microsoft, and virtually by Yu Jin Kim, product manager at Microsoft's Edge and Platforms.

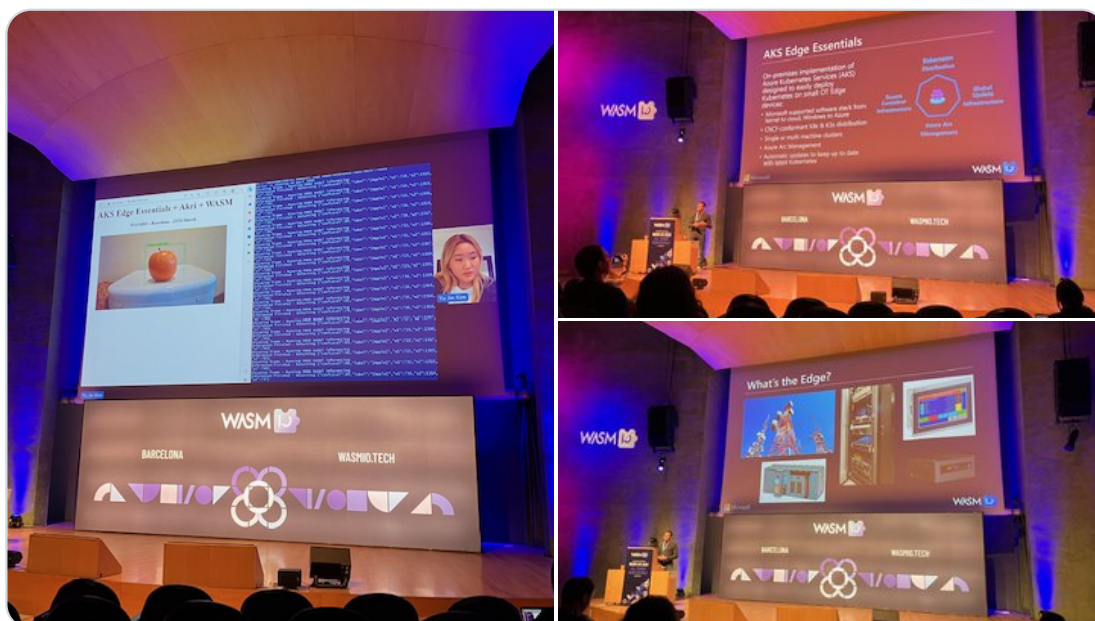


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Edge deployments with WebAssembly were shown to work: AKS Edge Essentials and Akri on WASMs (and other tools) in this demo given by Microsoft's Francisco Cabrera and Yu Jin Kim (virtually). Cameras capture apples! [@wasm\\_io](#) [#wasm](#) [#wasmio23](#) [@thenewstack](#) [revecom.io](#)



1:31 PM · Mar 24, 2023



Lieutier and Kim showed how a WASM module was used to deploy and manage camera devices through a Kubernetes environment. This was accomplished with AKS Edge Essentials and Akri. One of the main benefits of WASM's low power was being able to manage the camera device remotely that like other edge devices, such as thermometers or other sensor types, would lack the CPU power to run Kubernetes that would otherwise be a requirement without WASM.



"How can we coordinate and manage these devices from the cluster?" Kim said. The solution used in the demo is Akri, which is a Kubernetes features interface to makes connections to the IoT devices with WASM, Kim explained.

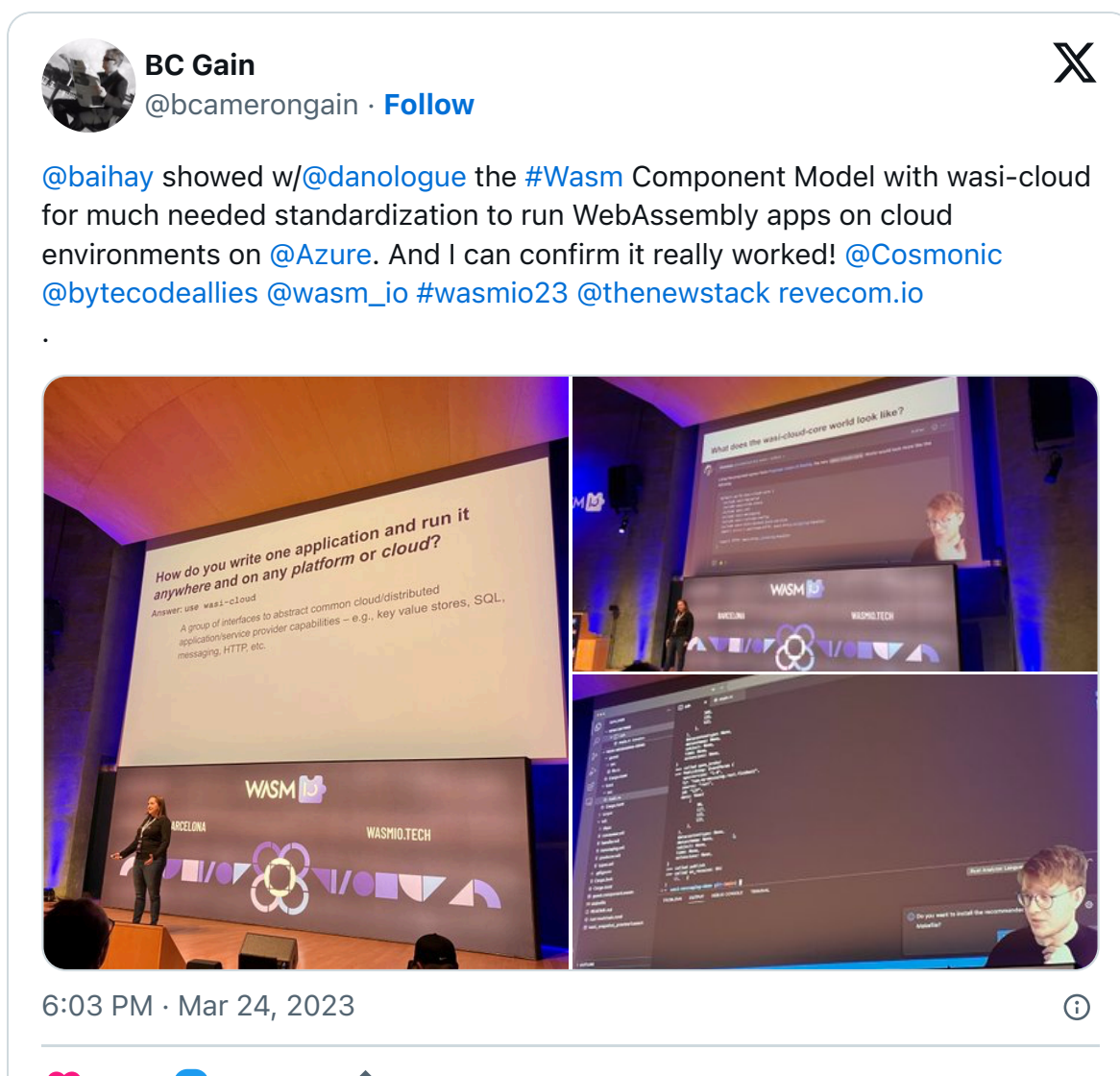
However, while different edge devices can be connected and managed with WASM with AKS Edge Essentials and Akri, the edge device network is not yet compatible with say an edge network running under an AWS cluster from the cloud or distributed directly from an on-premises environment.

Again, the issue is interoperability. "We know that WebAssembly already works. It does what you need to do and the feature set of WASM has already been proven in production, both in the browser and on the server," **Ralph Squillace**, a principal program manager for Microsoft, Azure Core Upstream, told The New Stack during the conference sidelines.

"The thing that's missing is we don't have interoperability, which we call **portability** — the **ability to take the same module and deploy it after rebuilding a different cloud** but you need a common interface, common runtime experience and specialization. That's what the component model provides for interoperability.

Not that progress is not being made, so hopefully, the interoperability issue will be solved and a standardized component model will be adopted for edge devices in the near future. As it stands now, WASI has emerged as the best candidate for extending the reach of Wasm beyond the browser. Described as a **modular system interface** for WebAssembly, it is

proving apt to help solve the complexities of running Wasm runtimes anywhere there is a properly configured CPU — which has been one of the main selling points of WebAssembly since its creation. With standardization, the Wasi layers should eventually be able to run all different Wasm modules into components on any and all edge devices with a CPU.



During the talk “wasi-cloud: The Future of Cloud Computing with WebAssembly,” Bailey Hayes, **Bailey Hayes**, director of the **Bytecode Alliance** Technical Standards Committee and a director at Cosmonic and Dan Chiarlone (virtually), an open source Software engineer at Microsoft’s WASM Container

Upstream team, showed in a working demo how wasi-cloud offers standardized interfaces for running Wasm code on the cloud.

"Our answer to the question of how do you write one application that you can run anywhere across clouds is with wasi-cloud," Hayes said. "And you can imagine that using standard APIs, one application is runnable anywhere or on any architecture, cloud or platform."

TNS

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BC Gain is founder and principal analyst for ReveCom Media. His obsession with computers began when he hacked a Space Invaders console to play all day for 25 cents at the local video arcade in the early 1980s. He then...

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